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(54) Inhibiting alcohol addiction

(57) Compositions for inhibiting alcohol addiction contain: leukoanthocyans, catechins, flavanols, lignin, reducing sugars, pectin, free aminoacids, organic acids, sterols, methylsterols, dimethysterols, lignanes, lignane glycosides, phenolic acids, phenol aldehydes and alkylferulates. Alcoholic beverages containing these compositions are also disclosed.

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Composition Inhibiting Pathological Addiction to Alcohol

Field of the Invention

The present invention relates to compositions for inhibiting the development of a pathological addiction to alcohol, and to processes for their manufacture.

Background of the Invention

Known in the art is an alcoholic bitter liqueur comprising the following ingredients, kg/1,000 decalitres:

Aralia root	2.5
Eleutherococcus extract	20
Schizandra (fresh berry)	345
Sugar	200
Natural honey	50
Tint	25
Aqueo-alcoholic liquid	the balance.

(See "Formulations of Liqueur-Vodka Products and Vodkas", "Legkaya i Pistschevaya Promyshlennost" (Light

and Food Industry) Publishing House, Moscow, 1981, p.188).

Also known in the art is an alcoholic bitter liqueur including the following ingredients, kg/1,000 decalitres:

Eleutherococcus extract	200
Schizandra (fresh berry)	92
Schizandra (seeds)	0.6
Natural honey	50
Tint	30
Aqueo-alcoholic liquid	the balance.

(See "Formulations of liqueur-Vodka Products and Vodkas", Light and Food Industry Publishing House, Moscow, 1981, p.206.)

The prior art alcoholic liqueurs are produced by way of blending the starting components, a successive introduction, into the resulting blend, of an aqueo-alcoholic liquid, settling of the resulting mixture and filtration thereof.

As it is seen from the above-specified formulations, the latter contain a biologically active extract of Eleutherococcus which lowers the toxic effect of ethanol in a living organism.

However, low taste properaties of the prior art beverages caused by a limited content of aromatic compounds, as well as a "pharmaceutical" aftertaste due to the presence of Eleutherococcus extract, high costs of the starting ingredient - Eleutherococcus extract - and limited availability of this plant do not enable a wide scale of consumption of these prior art beverages.

The present invention resides in the provision of a composition inhibiting the development of a pathological addiction to alcohol which, according to the present invention, comprises the following ingredients, mg/g:

leukoanthocyanes	219-270
catechins	153-187
flavanols	81-99
lignin	68-83
reducing sugars	216-264
pectin	18-22
free amino acids	27-33
organic acids	36-44
sterols	4.5-5.5
methylsterols	1.35-1.65
dimethylsterols	1.98-2.42
lignans	13.5-16.5
lignan glycosides	9-11
phenolic acids	13.5-16.5

phenolic aldehydes	4.5-5.5
alkylferulates	4.5-5.5

The composition according to the present invention advantageously comprises a combination of compounds occurring in nature. The composition has a pronounced capability of affecting processes of ethanol metabolism without switching to unfavourable routes of the organism's utilization of ethanol; as a result, the process of formation of a physical dependence on alcohol is delayed, the level of its consumption is lowered and certain alcoholic behaviour excesses disappear. Furthermore, the composition according to the present invention is not toxic and is safe upon prolonged consumption; it has positive organoleptic characteristics and can be useful as a food additive to alcoholic and alcohol-free beverages.

In a preferred aspect, the present invention resides in that an alcoholic beverage comprising sugar, citric acid, a tint and an aqueous-alcoholic liquid, according to the present invention also incorporates fruit alcohol and a composition of substances inhibiting the development of a pathological addiction to alcohol containing, mg/g: leukoanthocyanes - 219-270, catechins - 153-187, flavanols - 81-99, lignin - 68-83, reducing sugars - 216-264, pectin - 18-22, free amino acids

-27-33, organic acids - 36-44, sterols - 4,5-5.5, methylsterols - 1.35-1.65, dimethylsterols - 1.98-2.42, lignans - 13.5-16.5, lignan glycosides - 9-11, phenolic acids - 13.5-16.5, phenol aldehydes - 4.5-515, alkylferulates - 4.5-5.5, the ingredients being present in the following proportions, kg per 1,000 decalitre of the beverage:

the above-specified composition	473-493
fruit alcohol 40°	4,950-5,050
sugar	95-105
citric acid	1.8-2.2
tint	28-32
aqueous-alcoholic liquid	the balance.

The alcoholic beverage according to the present invention is capable of inhibiting a pathological addiction to alcohol and has high organoleptic properties - the tasting test of the beverage is not less than 9.1 points.

This alcoholic beverage may be produced by a process comprising blending of sugar, citric acid and a tint, followed by the addition, to the resulting blend, of an aqueo-alcoholic liquid, settling and filtration, wherein according to the present invention blended are 473-493

kg of a composition inhibiting a pathologic addiction to alcohol, 4,950-5,050 kg of a 40° fruit alcohol, 95-105 kg of sugar, 1.8-2.2 kg of citric acid and 28-32 kg of tint; to the resulting blend the aqueous-alcoholic liquid is added in the amount required for the preparation of 1,000 decalitre of the beverage; prior to settling and filtration the final blend is subjected to a triple successive thermal treatment for 5-8 hours at a temperature of 70-80°C and to cooling to attain a temperature within the range of from 0 to -10°C.

Other subjects and advantages of the present invention will now be more fully apparent from the following detailed description of the alcoholic beverage and the process for producing same according to the present invention.

The beverage according to the present invention contains, kg per 1,000 decalitre of the beverage:

Composition inhibiting a pathological addiction to alcohol	473-493
40° fruit alcohol such as pear alcohol, apple alcohol, plum alcohol, tangerine alcohol	4,950-5,050
sugar	95-105

citric acid	1.8-2.2
tint	28-32
an aqueo-alcoholic liquid (comprising a mixture of water and ethanol in a desired ratio)	the balance

The desired ratio of ethanol and water in this mixture depends on the final strength of the produced beverage.

When the alcoholic beverage of the present invention is consumed, the process of the formation of a physical dependence on ethanol in the organism is inhibited. Furthermore, drinking of this beverage is not accompanied by such negative effects as a "hang-over" syndrome.

The tasting test value of the above alcoholic beverage according to the present invention is not less than 9.1 points. An improvement in organoleptic properties is attained due to an increased content of aromatic substances, in particular esters of derivatives of aromatic acids and higher alcohols, as well as due to interaction of aldehydes, ketones, acetals and alkylferulates being present in the beverage composition.

An alcoholic beverage according to the present

invention is produced in the following manner. There are blended: a composition inhibiting the development of a pathological addiction to alcohol, a fruit alcohol, sugar, citric acid, a tint, whereafter the resulting blend is added with an aqueo-ethanolic liquid in an amount necessary to obtain the beverage of 40% strength. Then the resulting blend is subjected to a successive heat treatment for three times at a temperature of 70-80°C for a period of 5-8 hours. Thereafter, the blend is cooled for a period sufficient to acquire a temperature within the range of from 0 to -10°C. Then the thus-produced beverage is filtered, allowed to stand for 10 days at a temperature varied within the range of from 10 to 45°C and again filtered.

Production Example 1

There are blended 483 kg of a composition containing, mg/g: leukoanthocyans - 245.0, catechins - 180.0, flavanols - 90.0, lignin - 75.0, reducing sugars - 261.7, pectin - 20.0, free amino acids - 30.6, organic acids - 39.0, sterols - 5.0, methylsterols - 1.5, dimethylsterols - 2.2, lignans - 15.0, lignan glycosides - 10.0, phenolic acids - 15.0, phenol aldehydes - 5.0, alkylferulates - 5.0, 40° pear alcohol - 4,990 kg, sugar - 105 kg, citric acid - 2.2 kg, tint - 32 kg

and an aqueo-ethanolic liquid in an amount required to obtain a blend following heat treatment at the temperature of 75°C for 6 hours. Thereafter the blend is cooled to a temperature of 0 to 2°C. Then the beverage is filtered, settled for 10 days at a temperature within the range of from 10 to 15°C.

The final product is filtered while being bottled.

Production Example 2

A beverage is produced by blending 473 kg of a composition containing the following ingredients in the amounts specified hereinbelow, mg/g: leukoanthocyans - 219, catechins - 153, flavanols - 81, lignin - 68, reducing sugars - 345.17, pectin - 16, free amino acids - 27, organic acids - 36, sterols - 4.5, methylsterols - 1.35, dimethylsterols - 1.98, lignans - 13.5, lignan glycosides - 9, phenolic acids - 13.5, phenol aldehydes - 4.5, alkylferulates - 4.5.

It also contains, as indicated in Example 1, 4,950 kg of a 40°C plum alcohol, 95 kg of sugar, 1.8 kg of citric acid, 28 kg of a tint and an aqueo-ethanolic liquid in an amount sufficient to obtain a blend with the strength of 40 vol%. Thereafter the blend is subjected to a triple successive heat treatment for 5

hours at the temperature of 80°C. Then the blend is cooled for a period of time sufficient to acquire a temperature of 0 to 1°C. Then the beverage is filtered, allowed to stand for 10 days at a temperature of 20 to 22°C.

The final product is again filtered when being bottled.

Production Example 3

There are blended 493 kg of a composition containing the following ingredients in the amounts specified hereinbelow, mg/g: leukoanthocyans - 270, catechins - 187, flavanols - 99, lignin - 83, reducing sugars - 197.5, pectin - 22, free amino acids - 33, organic acids - 44, sterols - 5.5, methylsterols - 1.65, dimethylsterols - 2.42, lignans - 16.5, lignan glycosides - 11, phenolic acids - 16.5, phenol aldehydes - 5.5, alkylferulates - 5.5, a 40° tangerine alcohol - 5,050 kg, sugar - 105 kg, citric acid - 2.2 kg, tint - 32 kg, an aqueo-alcoholic liquid in an amount sufficient to obtain a blend of a 40 vol.% strength. Thereafter the blend is subjected to a triple successive heat treatment for 5 hours at the temperature of 80°C. Then the blend is cooled for a period of time sufficient for it to acquire a temperature of 8-10°C. Then the

beverage is filtered, allowed to stand for 10 days at a temperature of from 40 to 45°C.

The final product is again filtered when being bottled.

Further objects and advantages of the present invention will now become more fully apparent from the following detailed description of a composition inhibiting the development of a pathological addiction to alcohol with reference to examples illustrating its particular embodiments.

The composition according to the present invention preferably contains, as leukoanthocyanes, leuko-dolphinidine, leukocyanidine and leukopelargonidine. As catechins it contains (-)epigallocatechin, (+)gallocatechin, (-)epicatechin, (+) catechin and (-)epicatechingallate. As flavanols the composition according to the present invention contains kaempferol-3-monoglucoside, quercetin-3-monoglucoside, myricetin-3-monoglucoside and astragalin. As sugars it contains D-glucose, D-fructose, saccharose, raffinose, arabinose, xylose. As free amino acids the composition according to the present invention contains lysine, histidine, arginine, aspartic acid, threonine, serine, glutamic acid, proline, glycine, alanine,

cystine, valine, methionine, isoleucine, leucine, tyrosine and phenylalanine. As organic acids it contains tartaric acid, malic acid, citric acid, ascorbic acid, α-ketoglutaric acid, fumaric acid, galacturonic acid, glyceric acid, glycolic acid, glycouronic acid, oxalic acid, succinic acid, shikimic acid. As sterols the composition according to the present invention contains β-cetosterol, stigmasterol, kaempesterol. As methylsterols it contains obtusifoliol, citrostadienol. As dimethylsterols it incorporates α-amyrin, β-amyrin, lupeol, taraksterol, taraxasterol, germanicol. As lignans the composition according to the present invention contains oxymatairesinol, matairesinol, pinoresionol, liovyl, isolariciresinol and olivyl. As lignan glycosides it contains querinol arabinoside and querinol xyloside. As phenolic acids it contains paraoxybenzoic acid, protocatechinic acid, gallic acid, vanillic acid and syringic phenolic acids. As phenolic aldehydes the composition according to the present invention contains vanilline, syringic aldehyde, sinapic aldehyde and coniferyl aldehyde. As alkylferulates it contains alkyl esters of ferulic acid with the alcohol moiety being represented by octadecanol, eicosanol, docosanol, tetracosanol, hexacosanol.

The above-mentioned composition of the

herein-before-listed ingredients can also be obtained in the form of naturally-occurring complexes of biologically active substances of the vegetable origin.

The above-mentioned composition of the herein-before-listed ingredients is soluble in water, ethanol and aqueous-alcoholic solutions.

The composition according to the present invention has a low toxicity: LD_{50} is 36.5 ml per 1,000 g of body-mass of a rat.

We have carried out pharmacological studies of the effect of the composition according to the present invention on processes of ethanol consumption and on the formation of a physical dependence on animals and human beings.

Under conditions of a chronic experiment (15 weeks) on mature male rats of Wistar line the level of ethanol consumption was studied under the conditions of free choice between water and a 15% ethanol. Prior thereto the rats were tested for resistance to ethanol by the "side posture" procedure upon an intraperitoneal administration of a 25% ethanol at the rate of 4.5 g/kg of the body mass of the animals. In the experiment rats with similar characteristics of a high tolerance towards

ethanol were used. Later on the animal were placed into cases with calibrated drinking bowls under conditions of free choice between a 15% ethanol and water, and the daily consumption of the liquids was recorded.

The control group was composed of animals (12 rats) that consumed a 15% ethanol.

In the test group (12 rats) the composition according to the present invention was added to a 15% ethanol in the drinking bowl in the amount of 1 ml per 50 ml of 15% ethanol. After 13 weeks of active alcoholization the animals were deprived of the access to alcohol for 10 days (deprivation period) and then the amount of consumed solutions was recorded again. The experimental data are shown in Table 1.

In the group of control animals the deprivation period proceeded with withdrawal phenomena which manifested in a changed behaviour of the animals, signs of tremor were recorded, a moderate dishevelling of hair was noted. At the same time, in the control group no withdrawal symptons were observed.

The character of consumption of a 15% ethanol under free choice conditions in the control group was different from that of consumption of a 15% ethanol with

the composition according to the present invention in the test group. Beginning from the 8th weeks a clearly pronounced trend towards reduction of ethanol consumption in combination with the composition according to the present invention was observed and after deprivation this difference was exceeding 100%. An important indicator of a formed physical dependence on ethanol in the control group was an increased rate of ethanol consumption after a 10-days' deprivation by 12%. In the test group the consumption of ethanol in combination with the composition according to the present invention after deprivation remained at the same level.

TABLE 1

Effect of the composition according to the present invention on the amount of consumed 15% ethanol on a daily basis (in ml/kg of 1 animal's bodyweight) under free choice conditions

Table 1

	Statistic parameter	Time of consumption (in weeks)														
		1	2	3	4	5	6	7	8	9	10	11	12	13		15
1. Amount of consumed 15% ethanol (control group)	M ±	28.9	20.1	22.5	26.6	28.3	25.6	27.5	26.8	24.0	28.2	29.7	29.4	24.7	Deprivation 10 days	29.4
	m	1.86	1.18	2.29	2.05	1.8	1.97	2.32	1.33	2.06	2.25	1.76	3.44	1.29		3.12
2. Amount of consumed 15% ethanol with addition of the composition of this invention (1 ml per 50 ml of ethanol)	M ±	33.8	32.2	37.0	34.0	25.9	26.6	29.8	15.3	18.9	22.0	22.0	20.0	13.0	Deprivation 10 days	13.0
	m	3.88	4.09	2.93	3.11	2.53	2.26	1.3	1.49	1.36	2.17	1.66	2.42	2.12		2.41
	p	0.05	0.05	0.01	0.2	0.1	-	-	0.01	0.001	0.001	0.2	0.1	0.05		0.00

time of consumption (in weeks)

Addition, to a 15% ethanol, of the composition according to the present invention under conditions of a long-time forced alcoholization (38 months) with the absence of water in the food diet has resulted in a substantial redistribution of animals in groups of alcohol consumption (Table 2).

TABLE 2

Effect of the composition according to the present invention on distribution of rats according to the rate of consumption of a 15% ethanol (in per cent) (forced alcoholization).

Groups of animals	Alcoholization time*		
	3 months	6 months	8 months
Low-drinking (20-60 ml per 1,000 g of the bodymass)	26/45	73/76	67/79
Medium-drinking (60-80 ml per 1,000g of the bodymass)	31/12	22/21	21/15
Heavily-drinking above 80 ml per 1,000g of the bodymass)	43/13	5/3	12/6

*) Note: In the numerator - consumption of a 15% ethanol, in the denominator - consumption of a 15% ethanol with the addition of a composition according to the present invention.

The conditions of this experiment contemplated an individual control of consumption of test solutions in groups of animals; among the rats administered with alcohol incorporating the composition according to the present invention the number of heavily-drinking animals was certainly smaller.

To avoid possible organoleptic effect of the composition according to the present invention on the level of ethanol consumption under free-choice conditions parallel experiments have been carried out where the composition was introduced intragastrically, not into the test solution. The test results turned to be identical irrespective of the routes of administration of the composition according to the present invention.

Gas-liquid chromatography was used to determine the amount of ethanol in blood of animals of the test and control groups that were given the test solution for the period of 3 months. 90 minutes prior to slaughtering the animals they were intraperitoneally administered with a 25% ethanol in combination with the composition according to the present invention in the ratio of 1:50 (test group).

The test results (Table 3) point to an essential increase (by more than 4 times) of ethanol in theblood of animals that were previously administered for a long time with the composition according to the present invention.

The rate of elimination of ethanol from blood depend, first of all, on activity of alcoholdehydrogenase (ADG) which has been studied against the background of an acute and chronical alcoholic intoxication.

Upon a single-time intraperitoneal administration, to animals of a 15% ethanol in the does of 4.5 g/kg of the body mass, 30 minutes thereafter the activity of alcohol dehydrogenase is 8.51 mM/min/l relative to the intact group; the composition additive according to the present invention inhibits activity of enzymes in the presence of ethanol which is 5.86 mM/min/l. In chronical experiments upon introduction of ethanol (passive alcoholization) over the period of 1.5 months of a daily administration of a 15% ethanol and ethanol in combination with the composition according to the present invention in the test does of 1 g/kg the data have been obtained which prove the results of the previous experiment (see Table 4).

Table 3

Effect of the composition according to the present invention on elimination of ethanol after the addition of a 25% ethanol 4.5 g/kg of the animals' bodyweight.

Experiment		Statistical parameter	Content of ethanol in blood, %
1		2	3
1. Digested content (introduction of a 25% ethanol)	7	M±m	0.72±0.14
2. 3-months' consumption of a 15% ethanol (introduction of 25% ethanol)	14	M±m p	1.0±0.14 0.2
3. 3-months' consumption of a 15% ethanol in combination with the composition of the present invention (administration of 11 25% ethanol)		M±m p	2.52±0.57 0.01
4. 3-months' consumption of a 15% ethanol in combination with the composition of this invention (administration of 25% ethanol + composition), 1:50	11	M±m p	4.26±0.78 0.001

Table 4

Activity of alcoholdehydrogenase in blood serum and liver upon administration of a 15% ethanol in combination with the composition according to the present invention orally for 1.5 months.

	Activity of alcohol - denydrogenase in blood serum by the Skursky method mM/min/l	Activity of alcohol-dehydrogenase according to Bonischoen method		Ethanol in blood
		Serum mM/min/l	Liver mM/min/l	μM/ml
1. 15% ethanol.	3.1±1.17	3.15±0.14	47.02±1.91	16.21±1.4
2. 15% ethanol+composition of this invention	2.63±0.49	2.86±0.05	37.4±1.61	21.87±2.5
3. Composition of this invention (aqueous solution 1:50)	2.76±0.33	2.21±0.05	34.39±2.6	4.32±0.4
4. Physiological solution	2.51±0.29	2.51±0.06	40.5±3.29	4.9±0.6
5. Intact	2.6±0.33	2.46±0.09	40.51±1.3	4.14±0.3

Under conditions of free choice between a 15% ethanol and water (control group) and between a 15% ethanol with the composition according to the invention and water after 1.5 and 3 months of consumption the activity of alcohol dehydrogenase was studied prior to and after deprivation. The results thus obtained are shown in Table 5.

TABLE 5

Activity of alcoholdehydrogenase at a free choice of the test solutions

Activity of alcoholdehydrogenase, ml/min/l	1.5 months of consumption		3 months of consumption	
	prior to deprivation	after deprivation	prior to deprivation	after deprivation
1. 15% ethanol	2.7±0.26	3.61±0.48	2.64±0.27	4.3±0.63
2. 15% ethanol + composition of this invention	1.87±0.22	3.35±0.44	3.95±0.66	2.63±0.49
3. Intact	4.33±1.08	4.79±0.64	2.2±0.28	3.08±0.58

Therefore, the composition additive according to the present invention decelerates oxidation of ethanol in the liver by inhibiting activity of alcohol dehydrogenase.

Observations were carried out to study the lipoid and carbohydrate metabolism in animals upon administration of the composition according to the present invention against the background of a 3- and 6-months' alcoholization. To this end, over the period of 3 and 6 months the rats were intragastrically administered with 2 ml of the hereinbelow-specified solutions per 100 g of the body mass. In the control: Group 1 distilled water; Group II - 15% ethanol; Group III - 15% ethanol containing a 5% composition according to the present invention; Group IV - aqueous solution of the composition according to the present invention.

The results thus obtained are shown in Tables 6, 7, 8 and 9 hereinbelow.

Table 6

Variation of the content of neutral lipoids in the liver of rats fed with the solutions for 3 months (in % of the total lipoids, M±m)

	Groups of animals				
	I control	II distillate	III aqueous solution of the composition of this invention	IV 15% ethanol+ composition of this invention	V 15% ethanol
Cholesterol esters	14,5±1.10	14.5±0.49	12.5±0.93 [1]	12.5±0.48 [1]	15.0±1.21
% of variation		100	86	86	103
Triglycerides	13.6±0.55	17.2±1.11 [2]	20.1+0.84 [3]	20.6+1.77 [3]	20.1+1.04 [3]
% of variation		127	148	151	148
Free fat acids	12.8±1.60	12.8±0.48	12.3±0.50	11.5±0.53	10.6±0.92 [1]
% of variation		100	96	90	83
Cholesterol	16.6±0.9	17.2±0.63	16.1±0.91	14.2±0.67 [1]	15.3±1.22
% of variation		104	97	86	92
Residual fraction	32.5±1.05	38.3±0.97	39.0±1.02	41.2±1.30	39.0±1.00

[1] $p < 0.05$; [2] $P < 0.02$; [3] $P < 0.01$

p - probability

Table 7

Variation of the content of neutral lipoids in the liver of rats fed with the solutions for 6 months (in % of the total lipoids, M±m)

Neutral lipoids	Groups of animals				
	Control	I distillate	II 15% ethanol	III 15% ethanol+ composition of this invention	IV aqueous solution of the composition of the invention
Cholesterol esters	16.9±0.69	16.52±0.70	16.62±0.35	16.74±0.27	15.81±0.14
% of variation		99	100	100	95
Triglycerides	15.16±0.21	13.88±0.12	18.19±0.26 [1]	14.18±0.22 [1]	13.64±0.42 [1]
% of variation		92	120	94	90
Free fatty acids	16.67±0.48	17.21±0.11	14.0±0.39 [1]	17.30±0.37	18.66±0.88
% of variation		103	84	104	112
Cholesterol	17.28±0.26	17.07±0.16	16.61±0.69	16.72±0.89	17.06±0.19
% of variation		99	96	97	99
Residual fraction	33.93±0.40	35.38±0.74	34.58±0.47	35.06±0.52	34.83±0.61

1) $p<0.05$;
2) $p<0.02$

Table 8

Variation of activity of lysosomal hydrolases in the liver of rats upon consumption of ethanol and the composition of this invention for 3 months and 6 months (nanomol/ml/min, M±m)

Groups of animals	3 months		6 months	
	β- glycosidase	β- galactosidase	β-glucosidase	β-galactosidase
Control	0.47±0.04	0.33±0.01	0.49±0.05	0.35±0.01
1. Distillate	0.43±0.01	0.35±0.01	0.54±0.08	0.43±0.02
% of variation of the control	91	106	110	78
II. 15 % ethanol	0.58±0.08[1)]	0.37±0.04	0.87±0.09[2)]	0.86±0.06[3)]
% of variation of the control	123	112	178	247
III. 15 % ethanol + composition of this invention	0.50±0.05	0.35±0.06	0.66±0.08[1)]	0.26±0.01
% of variation of the control	106	106	135	75
IV. Aqueous solution of composition of this invention	0.40±0.02	0.31±0.03	0.38±0.05	0.25±0.01[1)]
% of variation of the control	85	94	78	70

1) P<0.05; 2) P<0.01; 3) P<0.001

Table 9

Variation of the content of carbohydrate-containing biopolymers in the liver of rats fed with ethanol and with the composition of the invention for 3 months and 6 months (mg-%, M±m)

Groups of animals	3 months		6 months	
	Hexoses	Hexosamines	Hexoses	Hexosamines
1. Control	26.68±1.54	32.53±2.37	26.26±1.43	49.00±1.76
2. Distillate	18.67±1.12[1]	29.60±2.52	20.45±1.72	68.53±6.97[2]
% of variation of the control	70	91	78	140
3. Aqueous solution of the composition of this invention	33.35±2.73[1]	36.02±1.47	28.91±1.34	102.43±7.63[3]
% of variation of the control	125	111	110	209
4. 15% ethanol + composition of this invention	18.43±1.27[1]	28.10±2.65	19.71±1.10[1]	84.72+4.21[3]
% of variation of the control	69	86	75	173
5. 15% ethanol	16.67±1.22[1]	25.84±1.77[1]	16.32±1.00[2]	30.22±5.41[2]
% of variation of the control	62	79	62	62

1) $p<0.05$; 2) $p<0.01$; 3) $p<0.001$

Then we have carried out pharmacological tests of the composition according to the present invention as an agent for improving general resistance of the organism. For this purpose the effect of the composition according to the present invention on the heat-resistance of rats has been studied.

(I) Overheating of nondescript female rats (60 animals) is effected by irradiation with an UHF-field by means of an instrument for a microwave therapy with the frequency of 2,375 mHz - 17 mA for 10 days once a day over the period of 4 days. The test composition is administered in the dose of 2.5 ml/kg (intragastrically in all series of experiments) for 5 days before the beginning of irradiation and, on the say of experiment, one hour before irradiation. The death rate of rats is assessed after a 4-times' irradiation.

It has been found that during one day after the last irradiation in the control group 22% of the animals died, whereas among the rats administered with the composition according to the present invention the death rate was 11% ($p < 0.01$).

(2) Overheating of male rats of the Wistar line is effected in a thermostatted cabinet at the temperature of 43°C. The test composition in the dose of 2.5 ml/kg

is administered for the preventive purposes over the period of 20 days. The rectal temperature and death rate of the animals are assessed.

It has been found that in the control group 76% of the animals (28 animals out of 37) died, while against the background of the composition according to the present invention 56% of the rats died (22 rats out of 39; $p < 0.001$). The composition provided no effect on the rectal temperature.

(3) Under the same conditions of overheating of male rats of the Wistar line the composition according to the present invention is administered prophylactically over 48 days in the dose of 1 ml/kg.

It has been found that in the control group 54% of rats (30 animals out of 55) died, while upon overheating against the background of a long-time administration of the composition according to the present invention the death rate was 42% (24 rats out of 57; $p < 0.001$).

(4) Overheating of male rats of the Wistar line was effected in much the same manner. The test composition was administered in the dose of 1 ml/kg 50 minutes prior to overheating. The overheating duration is 40 minutes

and 2 hours. The animals were killed by decapitation. Tested were: the content of glycogen (herein and in other cases - by the Zeifter method); activity of hexokinase and glucoso-6-phosphatedehydrogenase (herein and in other cases - by the formation of nicotinamide-dinucleotidephosphoric acid (NADPH).

It has been found that in overheating of the rats for 40 minutes the composition inhibited the drop of the content of glycogen, as well as of the activity of hexokinase and glucose-6-phosphate dehydrogenase in the liver (see Table 10 hereinbelow).

Upon overheating for 2 hours the test composition provided no effect on the level of the studied parameters.

Overcooling of male rats of the Wistar line was caused by placing the animals into a refrigerator chamber at a temperature of 5°C for 1 and 2 hours. The composition according to the present invention was administered in the dose of 1 ml/kg 60 minutes before cooling.

It has been found that upon overcooling of rats during the first hour there is observed a decrease of glycogen stock in the liver, as well as lowering of

activity of hexokinase and glucose-6-phosphate dehydrogenase in this organ. A preliminary administration of the composition according to the present invention to the animals inhibited lowering of the studied parameters (see Table 11). Upon a 2-hours' cooling the composition according to the present invention provided no protective effect.

The effect of the composition according to the present invention on animals' resistance to a muscular fatigue has been also studied. To this end:

(1) Experiments are carried out on non-descript male mice with a mass of 28-33 g. The test composition is administered enterally by means of a probe to three groups of animals in three doses: 0.1, 0.15, 0.22 ml/20g one hour prior to the muscular work. The control animals are carried out on an "endless rope" apparatus. The duration of mice run along a vertical downwardly moving rope till a complete exhaustion was diagnosed. The dose of the composition extending the duration of mice run by 33% was found by graphical plotting.

TABLE 10

Effect of the composition according to the present invention on variation of glycogen (mg-%), hexokinase (μmol of NADPH/min/g of the tissue), glucose-6-phosphate dehydrogenase (μmol NADPH/min/g of the tissue) upon (overheating 45°C).

Group of animals	Glycogen	Hexo-ki-nase	Glucoso-6-phos-phatedehydroge-nase
1	2	3	4
	40 minutes of overheating		
1. Normal	3,226+148	0.42+0.025	1.80+0.61
2. Overheat-ing	2,387+209 p<0.005	0.34+0.19 p<0.020	1.57+0.095 p<0.050
3. Overheat-ing + compo-sition of the present invention	2,968+121 p<0.030	0.40+0.18 p<0.030	1.71+0.077 p<0.030
	2 hours of overheating		
1. Normal	4,628+207	0.50+0.019	1.56+0.058
2. Overheat-in	2,175+271 p<0.0001	0.31+0.027 p<0.0001	1.17+0.095 p<0.003
3. Overheat-ing + com-position according to the pre-sent inven-tion	2,869+219 p<0.060	0.29+0.020	1.04+0.081

p - in comparison with Groups 1-2 and Groups 2-3

TABLE 11

Effect of the composition of this invention on variation of the content of glycogen (mg-%) and activity of hexokinase (μmol NADPH/min/g of the tissue) and glucose-6-phosphate dehydrogenase (μmol/NADPH/min/g of the tissue) in the liver of rats upon overcooling (5°C)

Group of animals	Glycogen	Hexokinase	Glucoso-6-phosphate-dehydroge-nase
	1 hour of overcooling		
1 Normal	4109+195	0.51+0.017	1.62+0.078
2 Overcooling	2794+207	0.41+0.022	1.20+0.101
	p<0.0001	p< 0.003	p> 0.004
3 Overcooling + composition of this invention	p<0.020	p< 0.020	
	2 hours of overcooling		
1 Normal	3078+189	0.63+0.017	1.57+0.075
2 Overcooling	1754+237	0.47+0.028	1.27+0.103
	p<0.001	p< 0.0001	p < 0.037
3 Overcooling + composition of this invention	1908+226	0.44+0.022	1.41+0.091

p - in comparison of Groups 1-2 and 2-3.

Activity of the studied composition was expressed in conditional units - stimulant effect units (SEU_{33}).

As a result of tests it has been found that the muscular workability of mice was increasing proportional to the dose of the extract. Upon administration of the composition according to the present invention in the maximum dose (0.22 ml/kg) the workability increased by 41% as compared to the control (see Table 12 hereinbelow).

TABLE 12

Stimulant effect of the composition of this invention on duration of the muscular workability of mice in an "endless rope" apparatus

Group of animals	Duration of the run of the mice		
	minutes	%	p
Physiological solution (13)	27.0±2.1	100	
Composition of the invention			
0.1 ml/20 g (10)	30.0+1.8	111	0.5
0.15 ml/20 g (11)	32.0+2.8	118	0.5
0.22 ml/20 g (15)	38.0+2.7	141	0.001

Note: Shown in brackets is the number of animals.

(2) As a model of an experimental influence swimming of rats was used (herein and in other cases - male rats of the Wistar line) at the temperature of water of 30°C. The composition according to the present invention was administered to mice in the dose of 10 ml/kg one hour prior to the swimming. The ultimate duration of swimming was assessed (i.e. swimming till exhaustion).

It has been found that the rats' swimming duration in the control was 392.6±29.0 minutes, whereas against the background of the composition according to the present invention it was 519.4±40.0 minutes, i.e. by 32% longer ($p = 0.023$).

(3) The composition according to the present invention was administered one hour before the swimming in the dose of 1 ml/kg, whereafter the animals were allowed to swim for 15 minutes or 2 hours. The state of the animals was judged by the content of glycogen, activity of hexokinase and glucose-6-phosphate dehydrogenase in the liver.

It has been shown that the swimming of rats for both time limits specified hereinabove caused a decrease of glycogen content in the liver and lowering of the activity of hexokinase and glucose-6-phosphate

dehydrogenase. A preliminary administration of the composition according to the present invention inhibited the decrease of the studied parameters after a 2-hours' swimming, but did not affect their level after a 15-minutes' muscular load (see Table 13).

(4) The composition according to the present invention was administered one hour before a 15-minutes' swimming. The content of cyclic adenosinemonophosphate in adrenal glands, and the content of cyclic guanosine monophosphate in adrenal glands and in the liver was determined by the radioimmune method by means of Amersham equipment. A number of rats from the test and control groups were allowed to rest after swimming for one hour, whereafter the same characteristics were studied in them too.

TABLE 13

Effect of the composition of this invention on the content of glycogen (mg-%) and activity of hexokinase (μmol NADPH/min/g of the tissue) and glucose-6-phosphate dehydrogenase (μmol NADPH/min/g/ of the tissue) in the liver of rats in swimming (water temperature 30-32°C).

Group of animals	Glycogen	Hexokinase	Glucose--6-phosphate dehydrogenase
1	2	3	4
	Swimming for 15 minutes		
1 Normal	4216+216	0.50+0.019	1.44+0.068
2 Swimming	2993+278	0.31+0.029	1.01+0.094
	p<0.002	p<0.001	p< 0.010
3 Swimming + composition of the invention	2902+202	0.35+0.015	0.98+0.101
	Swimming for 60 minutes		
1 Normal	3511+201	0.54+0.025	1.51+0.075
2 Swimming	2633+163	0.37+0.024	1.13+0.095
	p<0.004	p<0.0001	p< 0.008
3 Swimming + composition of this invention	3089+133	0.44+0.021	1.39+0.071
	p<0.040	p<0.040	p< 0.040

p - in comparison of Groups 1-2 and 2-3

The swimming of rats caused elevation of the level of cyclic adenosine monophosphate and cyclic guanosine monophosphate in adrenal glands, as well as reduction of the content of cyclic guanosine monophosphate in the liver (acute stress at an energy supply at the account of glycolysis). After the animals' rest for one hour the level of cyclic adenosine monophosphate and that of cyclic guanosine monophosphate were turned to normal values. The composition according to the present invention provided no effect on the content of cyclic adenosine monophosphate and cyclic guanosine monophosphate in the liver one hour after swimming came to its normal values (see Table 14 hereinbelow).

The composition according to the present invention was also studied for resistance of rats to hypokinesia which was induced by keeping animals in individual cell-cages for 2 days. The test composition was administered during the entire period of hypokinesia in the dose of 1 ml/kg twice a day.

As a result of hypokinesia a reduction of glycogen stock in the liver was observed along with a decrease of concentration of cholesterol in adrenal glands and lowering of the activity of alcoholdehydrogenase (as determined by the method suggested by Schleisinger et al., 1966).

TABLE 14

Effect of the composition of this invention on the content of cAMP in adrenal glands, cGMP in adrenal glands and liver of rats after a muscular load and rest.

Group of animals	cAMP, pmol	cGMP, pmol	
	adrenal glands	adrenal glands	liver
1	2	3	4
1 Intact	8.5+0. 55 (7)	0.09+0.01 (7)	0.22+0.67 (7)
2 Swimming 15 minutes	17.9+1.8 (7) $p < 0.05$	0.30+0.04 (7) $p < 0.001$	0.14+0.035 (7)
3 Swimming for 15 min and rest for 1h	8.1+0.63 (6) $p < 0.05$	0.18+0.02 (7) $p < 0.001$	0.059+0.045 (6) $p < 0.001$
4 Swimming for 15 min and the composition of this invention	17.3+1.87 (7)	0.25+0.06 (6)	0.25+0.06 (6)
5 Swimming for 15 min+ composition of this invention and rest for 1 hour	9.0+0.65 (6)	0.14+0.01 (7) $p < 0.05$	0.136+0.009 (7) $p < 0.0001$

In the animals administered with the composition according to the present invention the reduction of the studied parameters after hypokinesia was less pronounced (see Table 15 hereinbelow).

TABLE 15

Effect of the composition of this invention on the content of cholestrol in adrenal glands (mg/g), the content of glycogen (mg-%) and activity of alcohol dehydrogenase (μmol NADPH/min/g of the tissue) in the liver of rats under hypokinesia (2 days).

Group of animals	Cholesterol	Glycogen	Alcohol dehydrogenase
1	2	3	4
1 Normal	44+1.6	3975+222	5.04+0.234
2 Hypokinesia	96+2.4	2862+251	5.90+0.250
	p<0.01	p< 0.004	p< 0.02
3 Hypokinesia + composition of this invention	p< 0.03	p< 0.04	p< 0.01

p - in comparison of Groups 1-2 and 2-3

We have also studied the effect produced by the composition according to the present invention on resistance of animals to different chemical factors.

(I) As a model of an injuring effect a hexenal narcosis was used. The composition according to the present invention was administered to rats in the doses of 2.5, 5.0, 10.0 ml/kg; 2 hours thereafter hexenal was administered intraperitoneally in the dose of 19.8 mg/100 g. The duration of the side posture state of the animals was assessed.

It has been found that the duration of the hexenal narcosis of the control rats was 90.6±3.9 minutes, while against the background of the composition according to the present invention administered in the dose of 2.5 ml/kg it was 85.5±5.4 min, in the dose of 5.0 ml/kg - 75.7±3.1 min (83.6%, p=0.009), in the dose of 10.0 ml/kg - 72.9+3.7 (80.5%, p = 0.005 that is, the composition according to the present invention exerted an awakening dose-depending effect.

(2) In experiments on mice narcosis was caused by means of sodium thiopental in three doses: 62.5, 75.0 and 100 mg/kg intraperitoneally. The composition according to the present invention was introduced in the does of 10.0 ml/kg two hours before the injection of

thiopental. The speed of occurrence of the side posture was determined, as well as the duration of the side posture period and the death rate of the animals was assessed.

It has been found that out of the mice administered with thiopental (62.5 mg/kg) against the background of the composition according to the present invention the side posture was acquired by 22% of the animals, whereas in the control (thiopental) - 100% of the mice ($p = 0.001$). The duration of the side posture period in the control was 53.5 minutes, in the experiment - 120 minutes ($p < 0.05$).

In the group of mice administered with thiopental in the dose of 75 mg/kg 28% of the animals died, whereas in the group of rats administered with thiopental against the background of the composition according to the present invention 12.5% of the animals died ($p < 0.001$). In the control group the side posture period lasted for 30.0 ± 0.0 minutes, whereas against the background of the composition according to the present invention - 260 ± 0.0 minutes ($p < 0.05$). The death rate of the animals in both groups was the same.

The composition according to the present invention has been also studied for certain aspects of

carbohydrate metabolism. To this end:

(I) In experiments on intact animals under conditions of a conventional feeding diet the composition according to the present invention was administered twice a day over 5 days. In this and subsequent series of experiments the concentration on glucose in blood was determined by the anthrone method, the content of glycogen in the liver - by the Zeifter method. It has been found that a 5-days' administration of the composition according to the present invention to intact animals caused a certain increase of sugar concentrations in blood and of glycogen in the liver (see Table 16).

(2) The study of carbohydrate metabolism has been performed on rats subjected to starvation for 18 or 48 hours. The test composition was administered in the dose of 1 mg/kg 1 hour prior to slaughter of the animals. The content of sugar in blood, the level of insulin in blood serum were determined by the radioimmune method.

It has been shown that a 18-hours' starvation of rats has caused reduction of the glycaemia level. The test composition inhibited reduction of the sugar content in blood (see Table 16). The rats' starvation

for 48 hours has caused a certain reduction of the sugar content on blood and glycogen content in the liver. This was accompanied by a lowered concentration of insulin in blood serum.

In a preliminary 5-days' administration of the composition according to the present invention to the animals only a trend was observed towards preservation of a previous level of sugar in blood and of glycogen in the liver. In this case the content of insulin in blood was certainly higher than in the control (subjected to starvation) animals (see Table 16 hereinbelow).

(3) The effect of the composition according to the present invention on the carbohydrate metabolism was studied on rats fed with an excessive diet. The composition was administered in the dose of 1 ml/kg 1 hour before slaughter.

Under conditions of an excessive diet of the rats the studied extract provided no effect on the concentration of sugar in blood, but it certainly increased the content of glycogen in the liver and reduced the level of insulin in blood (see Table 16 hereinbelow).

TABLE 16

Effect of the composition of this invention on some parameters of the carbohydrate metalolism in rats.

Group of animals	Blood sugar, mg-%	Liver glycogen, mg-%	Blood insulin, μUE/ml
1	2	3	4
	Normal diet of rats		
Normal	91.0+2.7 (9)	4966+406 (9)	-
Composition of this invention	100.5+1.78[x](13)	6071+250[x](10)	-
	Starvation for 18 hours		
Normal diet (10)	106.8+3.7	-	-
Starvation (8)	83.8+2.0[x]	-	-
Starvation + 1ml/kg of composition of this invention 30 minutes before slaughtering (10)	106.0+4.2[x]	-	-
	Starvation for 40 hours		
Normal diet (10)	116.5+5.0	5059+452	17.56+1.12
Starvation (10)	86.0+5.0[x]	495+257[x]	9.56+0.69
Starvation + composition of this invention	91.0+5.0	593+151	14.5+1.0[x]
	Excessive diet of rats		
Without composition of this invention (15)	119.0+4.3	4966+406	22.8+2.3
Composition of this invention	122.3+2.7	6071+250[x]	17.3+1.19[x]

x) $p < 0.05$,

Composition of this invention is administered intragastrically in the dose of 1 ml/kg twice a day over 5 days. Shown in brackets is the number of animals.

We have studied antioxidation properties of the composition according to the present invention. To this end, in order to activate a peroxy oxidation of lipoids, in rats of the Wistar line (40 animals) stress was caused by suspending them by the neck skin fold for 24 hours. The test group of animals was administered once with the composition of the present invention in the dose of 1 ml/kg prior to suspending. The accumulation of lipoid peroxides in the liver was assessed by the concentration of malonic dialdehyde in this organ.

It has been found that the composition according to the present invention caused no changes in the content of malonic dialdehyde in the liver of intact rats. In the rats which underwent the stress treatment by content of malonic dialdehyde in the liver increased 6 fold, whereas in the case of stress against the background of the composition according to the present invention the rate of accumulation of malonic dialdehyde was noticeably smaller (normal - 86.5±29.0; stress - 452±20; stress + composition according to the present invention - 296 ± 15; p = 0.001). Consequently, the composition according to the present invention possesses antioxidant properties.

We have also studied biochemical characteristics of human beings administered with the composition according to the present invention against the background of alcoholization.

Under clinical conditions the effect of the composition according to the present invention on the rate of elimination of ethanol from blood and on activity of blood alcohol dehydrogenase, as well as on activity characteristics of lysosomal hydrolases, the level of protein-combined hexosoamines and on fractions of neutral lipoids was studied. The first group of patients who took part in the studies consisted of persons suffering from chronic alcoholism and subjected to a stationary treatment; the second group was composed of persons belonging to the Mongoloid race genetically intolerant to alcohol; the third group - substantially healthy Europoids who did not abuse alcohol.

Under conditions of a double blind control the patients took a 40% ethanol with the composition according to the present invention (1:50) or an aqueous solution of this composition. The volume of the taken liquid was 200 ml per 70 kg of the bodymass. The intervals between intakes were 4 days. Blood from vein was taken prior to the liquid intake, 1 hour, 2 and 4 hours thereafter for biochemical investigations. The test results are shown in Tables 17, 18, 19, 20, 21 and 22 hereinbelow.

Activity of β-galactosidase in blood serum of volunteers (nanomol/ml/min, M±m)

No.	Groups	40% ethanol			
		Background	1 hour	2 hours	4 hours
1	2	3	4	5	6
1	Healthy europeoids	5.95±0.62	6.66±0.21	19.94±1.22[3)]	35.57±1.63[3)]
	% of variation		112	335	598
2.	Mongoloids	5.77±0.94	5.92±0.68	12.15±0.87[3)]	12.61±0.98[3)]
	% of variation		103	211	219
3.	Alcoholism suffering patents	8.79±0.67	21.92±0.94[3]	7.98±0.20	10.46±0.91[1)]
	% of variation		249	91	122

	background	1 hour	2 hours	4 hours
1	7	8	9	10
1.	5.72±0.19	5.09±0.27	4.06±0.44[1)]	6.85±0.48[1)]
		89	71	120
2.	6.89±0.47	6.30±0.33	6.87±0.57	7.50±0.44
		91	99	109
3.	11.72±0.72	11.95±0.83	13.94±0.85	24.26±1.58[3)]
		102	119	207

Table 17 (continued)

	40% ethanol+ composition of this invention		
background	I hour	2 hours	4 hours
I 11	12	13	14
1. 5.90±0.42	5.78±0.54	6.55±0.42	18.0±1.6[3]
	98	111	305
2. 6.33±0.44	9.39±0.71	9.23±0.84	16.4±1.5
	148	146	259
3.10.45±0.39	15.15±0.72[2]	14.00±0.86[2]	12.8±0.9[2]
	145	134	122

1) $p < 0.05$ 2) $p < 0.01$ 3) $p < 0.001$

Table 18

Variation of the content of hexosamines in human blood serum (mg-%), M±m

NN	Groups of volunteers	1. Healthy europeoids			
		backgro-und	I hour	2 hours	4 hours
1	2	3	4	5	6
1.	40% ethanol	72.57±3.55	66.93±4.10	66.00± ±2.51	61.20± ±2.62
	% of variation vs. the background		92	91	85
2.	40% ethanol+ composition of this invention	53.33±2.39	50.40±3.85	42.53± ±1.79[2)]	50.53± ±3.27
	% of variation vs. the background		95	80	95
3.	Composition of this invention	72.16± 4.01	94.13±3.92	93.44± ±4.04[3)]	87.52± ±1.90[2)]
	% of variation vs. the background		131	130	122

Table 18 (continued)

NN	II Healthy mongoloids			
	background	I hour	2 hours	4 hours
I	7	8	9	10
1.	48.93±3.31	46.40±1.72 95	48.64±2.93 99	53.20±3.75 109
2.	84.60±3.70	63.20±1.21[3] 75	100.64±3.70[2] 119	93.33±4.22 110
3.	36.68±3.71	45.21±3.00[1] 127	53.20±1.52[1] 149	53.20±2.74[3] 149

Table 18 (continued)

NN	III. Alcoholism-suffering patients			
	background	I hour	2 hours	4 hours
1	11	12	13	14
1.	68.30±2.76	56.06±2.81[1] 82	54.64±3.43[1] 80	57.37±3.32[1] 84
2.	75.94±4.41	73.71±3.10 97	66.97±5.37 88	70.42±4.16 93
3.	60.11±4.81	62.27±3.15 103	69.94±3.00[1] 116	60.23±3.30 100

1) $p < 0.05$

2) $p < 0.01$

3) $p < 0.001$

Table 18 (continued)

NN	II Healthy mongoloids			
	backgro-	I hour	2 hours	4 hours
1	7	8	9	10
1.	48.93±3.31	46.40±1.72	48.64±2.93	53.20±3.75
		95	99	109
2.	84.60±3.70	63.20±1.21[3)]	100.64±3.70[2)]	93.33±4.22
		75	119	110
3.	36.68±3.71	45.21±3.00[1)]	53.20±1.52[1)]	53.20±2.74[3)]
		127	149	149

Table 18 (continued)

NN	III. Alcoholism-suffering patients			
	backgro-und	I hour	2 hours	4 hours
1	11	12	13	14
1.	68.30±2.76	56.06±2.81[1)]	54.64±3.43[1)]	57.37±3.32[1)]
		82	80	84
2.	75.94±4.41	73.71±3.10	66.97±5.37	70.42±4.16
		97	88	93
3.	60.11±4.81	62.27±3.15	69.94±3.00[1)]	60.23±3.30
		103	116	100

1) $p < 0.05$

2) $p < 0.01$

3) $p < 0.001$

Table 19

Variation of the content of fractions of neutral lipoids in human blood serum of persons consumed 40% ethanol (in % of the total lipoids, M±m)

NN	Fractions	I group			
		background	I hour	2 hours	4 hours
1.	Cholesterol esters	21.72±1.81	27.03±1.32[1)]	23.06±1.15	23.95±0.90
	% of variation		125	106	110
2.	Triglycerides	17.40±0.72	16.53±0.97	19.11±0.75	19.08±0.78
	% of variation		95	110	110
3.	Free fatty acids	17.06±0.65	16.88±0.50	15.87±0.42	17.24±0.95
	% of variation		99	93	101
4.	Cholesterol	19.64±0.86	18.25±0.87	19.04±0.24	19.08±0.48
	% of variation		93	97	97
5.	Residual combined fraction	24.18±0.52	24.29±1.85	22.92±0.73	20.65±0.70

Table 19 (continued)

NN	II group			
	background	I hour	2 hours	4 hours
1	7	8	9	10
1.	26.66±1.19	27.89±1.33	21.22±0.54	29.62±1.44
		105	80	111

Table 19 (continued)

1	7	8	9	10
2.	17.45±0.76	16.63±0.86 95	16.48±0.71 94	19.02±0.22 110
3.	15.10±0.47	16.57±1.08 110	18.45±0.57[2)] 122	13.87±1.15 92
4.	18.54±0.50	17.79±0.26 96	20.04±0.66 108	17.03±0.71 92
5.	22.25±0.31	21.12±0.64	23.75±0.97	20.46±0.93

Table 19 (continued)

NN	III group			
	background	I hour	2 hours	4 hours
1	11	12	13	14
1.	25.90±2.14	26.47±2.16 102	22.66±1.05 88	25.37±2.48 98
2.	15.28±1.05	15.40±0.76 101	16.37±0.69 107	15.92±1.24 105
3.	15.29±1.35	18.64±47[1)] 122	19.29±0.47[2)] 126	16.69±1.99 109
4.	17.94±0.99	18.71±1.74 104	21.65±1.96 121	19.82±0.71 111
5.	25.60±1.68	20.78±0.81	20.03±1.16	22.13±1.29

1) $p < 0.05$; 2) $p < 0.01$

Group I - healthy europeoids;
Group II - healthy mongoloids;
Group III - alcoholism-suffering patients

Table 20

Variation of the content of fractions of neutral lipoids in human blood serum of patients consumed aqueous solution of the composition of this invention (in % of the total lipoids, M±m)

NN	Fractions	Group I			
		background	I hour	2 hours	4 hours
1	2	3	4	5	6
1.	Cholesterol esters	23.07±1.47	22.74±2.10	23.44±0.54	23.10±0.89
	% of variation		99	102	101
2.	Triglycerides	17.24±0.82	16.75±0.67	20.49±1.29	17.63±0.75
	% of variation		97	119	102
3.	Free fatty acids	16.14±1.20	17.17±0.39	16.85±0.42	17.90±0.63
	% of variation		110	104	111
4.	Cholesterol	17.43±1.57	18.69±1.93	19.97±0.54	17.89±0.93
	% of variation		107	115	103
5.	Residual combined fraction	26.12±2.30	24.05±1.70	19.25±0.74	23.48±0.71

Table 20 (continued)

NN	Group II			
	background	1 hour	2 hours	3 hours
1	7	8	9	10
1.	23.12±1.32	21.34±1.38 92	23.59±0.54 102	23.17±0.46 100
2.	16.79±2.02	18.99±0.47 113	17.73±0.33 106	18.08±0.56 108
3.	17.77±1.03	18.05±0.48 102	16.41±0.67 92	17.38±0.56 98
4.	18.09±0.60	20.33±0.37 112	20.51±0.55 113	20.88±0.44 115
5.	24.23±1.60	21.29±0.92	21.76±0.46	20.49±0.52

Table 20 (continued)

NN	Group III			
	background	1 hour	2 hours	3 hours
1	11	12	13	14
1.	22.49±0.44	24.87±0.54 111	24.43±0.86 109	24.05±0.62 107
2.	19.36±1.0	17.16±0.48 89	17.29±0.39 89	17.58±0.84 91
3.	17.77±0.65	17.77±0.55 100	17.76±0.36 100	15.05±0.99 85
4.	19.37±0.35	19.39±0.43 100	18.46±0.79 95	17.34±0.49 90
5.	21.01±0.61	20.81±0.82	23.06±1.10	25.90±1.13

Group I - healthy europeoids, Group II- healthy mongoloids, Group III - alcoholism - suffering patients.

Table 21

Variation of the content of fractions of neutral lipoids in human blood serum of patients consumed a 40% solution of ethanol (in % of the total lipoids, M±m) with the composition of this invention

NN	Fractions	Group 1			
		background	1 hour	2 hours	4 hours
1	2	3	4	5	6
1.	Cholesterol esters	24.35±2.04	23.91±0.67	22.04±0.41	21.53±0.68
	% of variation		98	91	88
2.	Triglycerides	16.41±0.71	18.14±0.30	18.48±1.24	19.51±0.69[1)]
	% of variation		111	113	119
3.	Free fatty acids	15.96±0.76	16.19±0.57	16.30±0.26	15.90±0.24
	% of variation		101	102	106
4.	Cholesterol	19.21±0.86	18.87±0.38	18.06±0.84	20.06±1.58
	% of variation		98	94	104
5.	Residual combined fraction	24.07±1.93	22.89±0.55	24.52±1.61	22.94±1.17

Table 21 (continued)

NN	Group II			
	background	1 hour	2 hours	4 hours
1	7	8	9	10
1.	22.30±1.01	24.32±0.55 109	23.15±1.45 104	22.89±0.70 103
2.	19.95±1.71	18.15±0.55 91	18.87±2.11 95	19.47±0.28 98
3.	16.12±0.46	16.17±1.10 100	15.83±0.58 98	16.95±0.84 105
4.	17.84±0.28	18.02±0.93 101	17.66±0.89 99	19.22±0.45 108
5.	23.79±2.03	23.34±0.60	24.46±1.45	21.47±1.33

Table 21 (continued)

NN	Group III			
	background	I hour	2 hours	4 hours
1	11	12	13	14
1.	24.60±0.59	24.05±0.62 100	24.26±0.34 101	22.94±0.90 95
2.	17.05±0.52	16.50±0.56 97	17.43±0.49 102	18.77±0.66 110
3.	15.95±0.53	16.63±0.41 104	17.00±0.50 107	17.01±0.52 107
4.	18.37±0.73	17.85±0.44 97	19.07±0.42 104	19.89±0.49 108
5.	24.03±0.79	24.97±1.08	22.24±1.20	21.39±0.51

1) $P < 0.01$ Group 1 - healthy europeoids; Group II - healthy mongoloids; Group III - alcoholism-suffering patients.

Table 22

System ADG-ethanol, in patients consumed solutions of ethanol and composition of this invention

NN	Fractions	40% ethanol			
		background	I hour	2 hours	4 hours
1	2	3	4	5	6
1. patients	A D G	0.46±0.16	1.24±0.56	1.83±0.58	2.39±0.66
2.	ethanol	0	0.27±0.01	0.198±0.023	0.113±0.014
3. mongoloids	A D G	2.81±0.97	3.15±0.67	3.17±0.87	3.15±0.89
4.	ethanol	0.012±0.007	0.174±0.033	0.188±0.024	0.064±±0.028
5. healthy europeoids	A D G	2.90±0.58	1.73±0.29	3.04±0.42	0.52±0.28
6.	ethanol	0.023±±0.002	0.263±±0.028	0.0124±±0.013	0.035±±0.000035

Table 22 (continued)

NN	40% ethanol + composition of this invention			
	background	I hour	2 hours	4 hours
1	7	8	9	10
1.	2.28±0.68	3.56±0.66	1.85±0.39	0.70±0.25
2.		0.138±0.032	0.182±0.054	0.203±0.022
3.	1.74±0.32	1.69±0.31	2.34±0.87	1.57±0.31
4.	0	0.206±0.023	0.105±0.029	0.103±0.033
5.	2.56±0.23	1.78±0.68	2.35±0.57	0.69±0.34
6.	0.049±±0.0004	0.174±0.025	0.174±0.016	0.086±0.01

Table 22 (continued)

NN	Composition of this invention			
	background	I hour	2 hours	4 hours
1	11	12	13	14
1.	1.06±0.46	0.79±0.27	1.79±0.35	1.67±0.47
2.	0.04±0.012	0.14±0.014	0.076±0.024	0.082±0.018
3.	2.48±0.64	1.59±0.58	1.69±0.47	2.37±0.76
4.	0	0	0	0
5.	1.00±0.37	1.64±0.40	1.37±0.47	1.27±0.36
6.	0.006±0.000008	0.042± ±0.032	0.076±0.035	0.015± ±0.00004

Measurement units: ADG (i/i); ethanol - mg-%;

ADG - alcoholdehydrogenase

We have also carried out for 10 months testing of the composition according to the present invention on 8,000 persons. To this end, alcoholic beverages containing the composition according to the present invention were used. The persons included in observations did not take any other alcoholic beverages during the entire period of tests. The total reduction of the total consumption over the period of 10 months constituted 28.01%.

Within 10 months of tests the number of alcoholic psychoses in this group of persons reduced to four cases compared for 12.5 cases on the average over the preceding 6 similar periods.

The course of alcoholic intoxications has also changed: easier hang-over states, a lowered demand for a hang-over drink due to the appearance of somatic complaints inhibiting continuation of heavy-drinking periods in alcohol-abusing persons.

No demographic and social excesses were noted among persons included in observations.

Therefore, on the ground of the carried out studies and experiments a conclusion may be made that the general effect of the composition according to the present invention directed against negative

after-effects of the alcohol consumption is composed of the effects provided by the composition ingredients on the main biological signs of alcohol:

- membranotropic effect of ethanol is lowered due to normalization of the membrane stability owing to regulation of the synthesis of cholestrol, its esterification and inclusion into the structure of membranes. This also results in normalization of activity of membrane-combined enzymes and other permeability characteristics according to the principle of Vitamin P - activity.

-Oxidation of ethanol is effected mainly in the liver with exhaustion of the oxidized form of nicotinamidedinucleotide NAD+. Other oxidizing processes occurring with the use of NAD+ are inhibited. The ingredients of the composition according to the present invention act as hydrogen ion acceptors and contribute to lowering of the ratio NADH/NAD^+.

-in the course of oxidation of ethanol in the organism the most toxic metabolite - acetaldehyde - is formed which when present in tissues is responsible for toxicological and narcotic characteristics of ethanol. The rate of oxidation of ethanol and acetaldehyde depends first of all on activity of alcohol

dehydrogenase and acetaldehyde dehydrogenase. The ingredients of the composition according to the present invention are capable of lowering the activity of alcohol dehydrogenase by decelerating oxidation of ethanol and, furthermore, of entering into competitive relations with ethanol as a substrate for alcohol dehydrogenase. In doing so, due to conformation of alcohol dehydrogenase there is effected oxidation of not ethanol, but, first of all, of the competing substrate incorporated in the composition according to the present invention;

-calorigenic effect of ethanol, owing to which it is a successful competitor in respect of other sources of energy while being superior to them by the availability criterion. This causes the narrowing of the main metabolic chain of conversion of a number of edible substances due to a competitive alienation of specific dehydrogenases and their prosthetic groups. The composition according to the present invention contributes to conservation and, upon a longtime consumption of alcohol, to restoration of other energy supply routes, in particular through gluconeogenesis.

The carried out tests of the composition according to the present invention in experiments on animals, in obsevations on volunteers have shown that the com-

position of this invention has an ability of providing rational ways for a high resistance and recovery of the organism. In all cases of extreme loads on animals (of both physical, chemical and biological character) a clearly-pronounced stress-protecting effect is observed. In addition thereto, the composition according to the present invention has specific biological properties of inhibiting the formation of a physical dependence on alcohol and of lowering detrimental effects of its toxic metabolites.

A wide range of biological action of the composition according to the present invention is explained by the fact that it comprises an indispensible set of substrates ensuring optimal ways of metabolism directed to the preservation of energy resources of the organism by way of synthesis of carbohydrates from non-carbohydrate metabolites through gluconeogenesis.

Example 1

A composition contains the following ingredients, mg/g: leukodolphinidine 120, leukocyanidine - 80, leukopelargonidine - 45, (-)epigallocatechin - 42, (+)gallocatachin - 31, (-)epicatchin - 29, (+)catechin - 60, (-)epicatechingallate - 18, kaempferol-3-mono-glucoside - 17, quercetin-3-monoglucoside - 22,

myricetin-3-monoglucodide - 14, quercetin-3-glucoside - 24, astragalin - 13, lignin - 75, D-glucose - 83.6, D-fructose - 64, saccharose - 33.5, raffinose - 24, arabinose - 25, xylose - 31.6, pectine - 20, lysine - 3.4, histidine - - 0.2, arginine - 0.4, aspartic acid - 4.3, threinine - - 1.1, serine - 2.0, glutamic acid - 3.0, proline - 3.3, glycine - 2.2, alanine - 3.8, cystine - 0.3, valine - - 1.8, methionine - 0.4, isoleucine - 0.8, leucine - - 2.8, tyrosine - 0.5, phenylalanine - 0.3, tartaric acid - 4.22, malic acid - 3.8, citric acid - 4.0, ascorbic acid - 4.0, α-ketoglutaric acid - 1.9, fumaric acid - 2.1, galacturonic acid - 2.2, glyceric acid - - 1.8, glycolic acid - 1.7, glycouronic acid - 3.0, oxalic acid - 2.3, succinic acid - 5.0, skikimic acid - 3.0, α-amyrine - 0.4, β-amyrine - 0.4, loupeol - 0.3, taraxasterol - 0.4, taraxerol - 0.4, germanicol - 0.3, obtusifoliol - 0.8, citrostadienol - 0.7, β-cetosterine - 3.2, stigmaiterol - 1.0, kaimpesterol - 0.8, oxymatairesinol - 2.9, matairesinol - 2.3, pinoresinol - - 2.5, liovyl - 2.7, isolariciresinol - 2.7, olivyl - - 1.9, querinol arabinoside - 6.2, querinol xyloside - - 3.8, parahydroxybenzoic acid - 1.2, protocatechinic acid - 3.5, gallic acid - 1.9, vanillic acid - 4.3, syringe acid - 4.1, vanilline - 1.5, syringe aldehyde - 1.3, sinapic aldehyde - 0.9, coniferyl aldehyde - - 1.3, octadecanol-

ferulate - 1.5, eicosanolferulate - - 1.4, docosanol-

ferulate - 1.1, tetracosanolferulate - - 0.5, hexacosanolferulate - 0.5.

This composition in the amount of 5 g is dissolved in 100 ml of a 40% aqueous-alcoholic solution.

The resulting aqueous-alcoholic solution has a red-brown colour, a weak characteristic scent and a soft astringent taste. The solution has a low toxicity. The LD_{50} is 36.5 ml/1.000 g of body mass of a rat. The solution is capable of providing rational ways for resistance and recovery of the organism, suppresses the formation of a physical dependence on alcohol and lowers detrimental effects of its toxic metabolites.

Example 2

A composition contains the ingredients similar to those specified in Example 1 in the following amounts, mg/g: leukoanthocyanes - 197.1, catechins - 137.7, flavanols - 72.9, lignin - 61.2, reducing sugars - 410.76, pectin - 16.2, free aminoacids - 24.3, organic acids - 32.4, sterols, methylsterols, dimethylsterols - 1.78, lignans - 12.1, lignan glycosides - 8.1, phenolic acids - 12.1, phenolic aldehydes - 4.05, alkylferulates - 4.05.

This composition in the amount of 5 g is dissolved in 100 ml of a 40% queous-alcoholic solution. The resulting aqueous-alcoholic solution has a red-brown colour, a weak, specific scent and a soft, slightly sweet, astringent taste. The solution has a low toxicity: the LD_{50} is 41.2 ml/1.000 g of body mass of a rat.

The solution has an ability of ensuring rational ways for resistance and recovery of the organism, slightly inhibits the formation of a physical dependence on alcohol and reduces, to a cetain extent, negative effects of its toxic metabolites. The composition has a low activity which is even not recorded in a number of biological tests.

Example 3

A composition contains the ingredients similar to those specified in Example 1 hereinbefore in the following amounts, mg/g: leukoanthocyanes - 219, catechins - 153, flavanols - 81, lignin - 68, reducing sugars - 345.17, pectin - 18, free aminoacids - 27, organic acids - 36, sterols - 4.5, methylsterols - 1.35, dimethylsterols - 1.98, lignans - 13.5, lignan glycosides - 9, phenolic acids 13.5, phenolic aldehydes - 4.5, alkylferulates - 4.5.

This composition in the amount of 5 g is dissolved in 100 ml of a 40% aqueous-alcoholic solution. The resulting solution is of a red-brown colour, it has a weak, specific scent and a soft, astringent taste. The solution has a low toxicity: its LD_{50} is 36.5 ml/ 1,000 g of body mass of a rat.

The solution is capable of providing rational ways for resistance and recovery of the organism; it inhibits the formation of a physical dependence on alcohol and slightly lowers negative effects or its toxic metabolites.

Example 4

A composition contains the ingredients similar to those specified in Example 1 in the following amounts, mg/g: leukoanthocyanes - 270, catechins - 187, flavanols - 99, lignin - 83, reducing sugars - 197.5, pectin - 22, free aminoacids - 33, organic acids - 44, steols - 5.5, methylsterols - 1.65, dimethylsterols - 2.42, lignans - 16.5, lignan glycosides - 11, phenolic acids - 16.5, phenolic aldehydes - 5.5, alkylferulates - 5.5.

This composition in the amount of 5 g is dissolved in 100 ml of a 40% aqueo-alcoholic solution. The resulting has a red-brown colour, a weak, specific scent

and a soft, astringent taste. The solution is of a low toxicity: its LD_{50} is 36.5 ml/1,000 g of body mass of a rat.

The solution is capable of ensuring rational ways for resistance and recovery of the organism, inhibits the formation of a physical dependence on alcohol and lowers negative effects of its toxic metabolites.

Example 5

A composition contains the ingredients similar to those of Example 1 in the following amounts, mg/g: leukoanthocyanes - 297, catechins - 205, flavanols - 109, lignin - 91, reducing sugars - 120.6, pectin - 24, free aminoacids - 36, organic acids - 48, sterols - 6, methylsterols - 1.8, dimethylsterols - 2.6, lignans - 18, lignan glycosides - 12, phenolic acids - 18, phenolic aldehydes - 6, alkylferulates - 6.

The composition in the amount of 5 g is dissolved in 100 ml of a 40% aqueo-alcoholic solution. The resulting solution has a red-brown colour, a pronounced , specific odour and an astringent taste. The solution has a low toxicity: its LD_{50} is 33.3 ml/1,000 g of body mass of a rat.

The solution is capable of ensuring rational ways for resistance and recovery of the organism; it inhibits the formation of a physical dependence on alcohol and diminishes detrimental effects of its toxic metabolites.

CLAIMS:

1. A pharmaceutical composition for administration inter alia to inhibit the development of a pathologival addiction, which comprises the following ingredients, mg/g:

leukoanthocyanes	219-270
catechins	153-187
flavanols	81-99
lignin	68-83
sugars	216-264
pectin	18-22
free aminoacids	27-33
organic acids	36-44
sterols	4.5-5.5
methylsterols	1.35-1.65
dimethylsterols	1.98-2.42
lignans	13.5-16.5
lignan glycosides	9-11
phenolic acids	13.5-16.5
phenolic aldehydes	4.5-5.5
alkylferulates	4.5-5.5.

2. A composition to claim 1 containing leucodolphinidine, leucocyanidine or leucopelargonidine.

3. A compositon according to claim 1 or claim 2 containing (-) epigallocatechin, (+) gallocatechin, (-) epicatechin, (+) catechin or (-) epicatechingallate.

4. A composition according to any of claims 1 to 3 containing kaempferol-3-monoglucoside, quercetin-3-monoglucoside, myricetin-3-monoglucoside or astraglain.

5. A composition according to any of claims 1 to 4 containing D-glucose, D-fructose, sucrose, raffinose, arabinose, or xylose.

6. A composition according to any of claims 1 to 5, containing lysine, histidine, arginine, aspartic acid, threonine, serine, glutamic acid, proline, glycine, alanine, cystine, valine, methionine, isoleucine, leucine, tyrosine or phenylalanine.

7. A composition according to any of claims 1 to 6 containing tartaric acid, malic acid, citric acid, ascorbic acid, α-ketoglutaric acid, fumaric acid, galacturonic acid, glyceric acid, glycolic acid, glycouronic acid, oxalic acid, succinic acid, or shikimic acid.

8. A composition according to any of claims 1 to 7 containing β-cetosterol, stigmasterol, kaempesterol,

obtusifoliol, citrostadienol, α-amyrin, lupeol, taraksterol, taraxasterol, or germanicol.

9. A compositon according to any of claims 1 to 8 containing oxymatairesinol, matairesinol, pinoresinol, liovyl, isolariciresinol or olivyl, querinol arabinose or querinol xyloside.

10. A composition according to any claims 1 to 9 containing parahydroxybenzoic acid, protocatechinic acid, gallic acid, vanillic acid ot syringic phenolic acids.

11. A composition according to any of claims 1 to 10 containing vanillin, syringic aldehyde, sinapic aldehyde or coniferyl aldehyde.

12. A composition according to any of claims 1 to 11 containing alkyl esters of ferulic acid with the alcohol moeity being represented by octadecanol, eicosanol, docosanol, tetracosanol, or hexacosanol.

13. An alcoholic beverage comprising the following , per 1,000 decalitres of the beverage: 473-493 kg of a compostion according to any of claims 1 to 12;

4,950-5,050 kg of a 40° fruit alcohol,

95-105 kg of sugar,

1.8-2.2 kg of citric acid,

28-32 kg of a tint; and

4,317.8-42.2 kg of an aqueous-alcoholic liquid.

14. A process for producing an alcoholic beverage according to Claim 13 comprising:

- blending 473-493 kg of a composition according to any of claims 1 to 12, 4,950-5,050 kg of a 40° fruit alcohol, 95-105 kg of sugar , 1.8-2.2 kg of citric acid, and 28--32 kg of a tint to form a blend;

-adding the resulting blend with an aqueous-alcoholic liquid in an amount necessary to obtain 1,000 decalitres of the beverage;

-a triple succesive heat treatment of the resulting blend for 5-8 hours at a temperature within the range of from 70 to 80°C;

-cooling of the blend after the heat-treatment thereof for a period of time sufficient to impart to the blend a temperature within the range of from 0 to -10°C.

-allowing the blend to stand till its clarification;
-filtration of the blend clarified upon settling;

15. A compositon according th Claim 1, subatantially as described in the Specification and Examples hereinbefore.

16. A process for producing a compositonaccording to Claim 2, substantially as described in the Specification and Examples hereinbefore.

17. An alcoholic beverage according to claim 13, substantially as described in the specification and Examples hereinbefore.

18. A process for producing an alcoholic beverage according to claim 14, substantially as described in the specification and Examples hereinbefore.

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